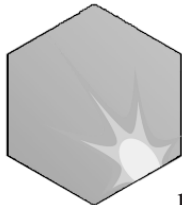


# The Next Generation of Sample Return Missions

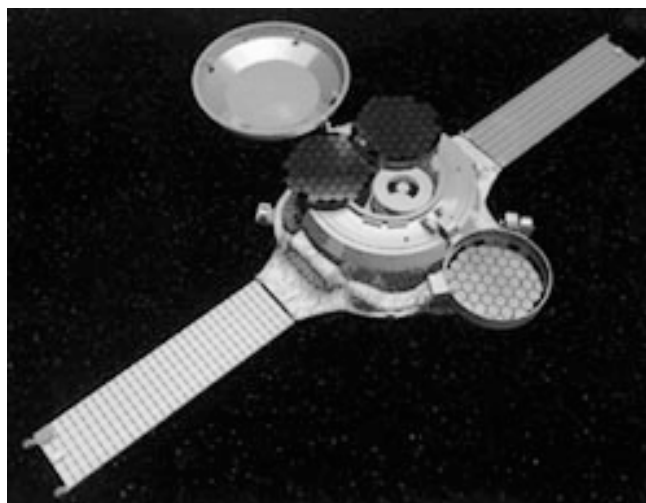
The Johnson Space Center is NASA's center of excellence for astromaterials—or materials from space. Moon rocks and soil from the Apollo missions, meteorites collected in Antarctica, and cosmic dust from the Earth's stratosphere continue to yield valuable information about the early history of the Moon, the Earth, and the inner solar system. The next generation of sample return missions will provide scientists and researchers with samples of solar wind, comet dust particles, and rocks and soil from Mars. These new samples may help scientists around the world solve some of the mysteries surrounding the birth and evolution of our solar system and the emergence of life.



## Genesis

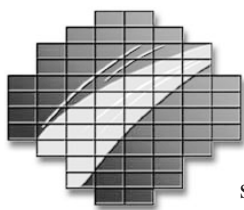
NASA's Genesis mission will return samples of solar wind to the Earth. This mission represents the first NASA return of extraterrestrial samples since the Apollo program ended in the early 1970's. Solar wind consists of atoms and ions which are spewed from the Sun. By studying the composition of the solar wind, scientists hope to determine the makeup of the solar system and understand its origin.

Solar wind does not strike the Earth directly, but is deflected by the Earth's magnetosphere. The magnetosphere is the area around the Earth where the magnetic field caused by the iron core can be detected. In order to collect the solar wind particles, NASA will launch a spacecraft containing the Genesis payload in January 2001 and place it beyond the Earth's magnetosphere. Once the spacecraft is oriented properly, collectors consisting of ultra-pure materials will be exposed and then allowed to Sun bathe for 2 years. The canister containing the collectors will be returned to the Earth in August 2003 and brought to JSC for curation and study.



The collector material will be carefully cataloged, stored in a clean environment, and distributed to scientists for analysis with state-of-the-art laboratory instruments. A portion of this material will be set aside as a reservoir of solar matter to be analyzed by yet undeveloped instruments and scientific techniques.

[www-curator.jsc.nasa.gov/curator/genesis](http://www-curator.jsc.nasa.gov/curator/genesis)

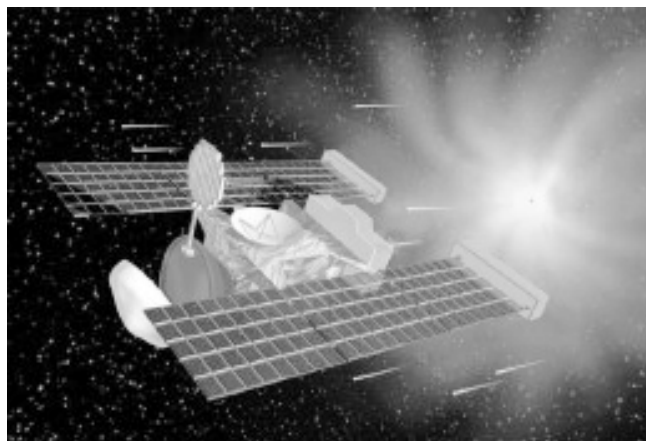


# Stardust

**STARDUST**, a NASA Discovery-class mission, is the first to return samples from a comet. Grains from comet Wild-2's coma—the gas and dust envelope that surrounds the nucleus—will be collected as well as interstellar dust.

Billions of years ago, comets struck the early Earth as it formed, and brought with them water and carbon-based molecules—elements of life—to this planet. By studying comet particles, scientists may be able to solve some of the mysteries surrounding the birth and evolution of life in the solar system. Comets are also believed to be the fundamental building blocks of the solar system, and their study will shed light on the origin of the Sun and planets.

The mission launched February 7, 1999 and will encounter the comet on January 10, 2004. As the



spacecraft passes through the coma, a tray of silica aerogel will be exposed, and coma grains will impact there and become captured. Following the collection, the sample return capsule will return to Earth in 2006, and be immediately flown to the Curation Laboratory at the Johnson Space Center.

[www-curator.jsc.nasa.gov/curator/stardust](http://www-curator.jsc.nasa.gov/curator/stardust)

## MARS Sample Return

The Mars Sample Return Project constitutes an exciting and complex robotic space mission of historical proportions akin to Sputnik and Apollo. The project is being implemented by NASA's Jet Propulsion Laboratory, and is a component of the Mars Surveyor Program. The primary objectives of the Mars Surveyor program are to further our understanding of the biological potential and possible biological history of Mars, and to search for indicators of past and/or present life there. Early in the twenty-first century, NASA, in collaboration with France's Centre National D'Etudes Spatiales (CNES), plans to launch two missions to Mars which will collect samples and return them to Earth. The samples will yield evidence concerning the climatic and geologic evolution of the planet, which in turn, will increase our understanding of the suitability of Mars as a possible abode of past or present life.



The JSC Office of Astromaterials, is planning for the eventual return of the Mars samples. The scientific, technical, and environmental details of the Mars Sample Return Project are still being developed. The primary objectives are to protect the Earth from any potential contamination from the samples themselves, to protect the samples from becoming contaminated by Earth, and to distribute the samples to the scientific community worldwide. JSC's focus is on the sample recovery plan, quarantine issues, sample testing and curation.

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